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Peer Assisted Study Sessions to Enhance Learning Strategies and Social Inclusion in Undergraduate Students from Low Socioeconomic Backgrounds

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Abstract

Students from low-socioeconomic status (SES) backgrounds are typically under-represented in Australian universities. At Victoria University in Melbourne, Australia, there is an increased number of low SES students (20%), with a significant proportion of mature aged (Paramedicine) and “first in family” from immigrant communities (Biomedical Sciences). The aim of this study was to determine if students undertaking Peer Assisted Study Sessions (PASS) in an anatomy and physiology subject in Paramedicine and Biomedical Sciences also developed study skills, time management skills, confidence in their ability to complete their studies and social networks. Evaluation surveys, consisting of nine questions with a Likert scale of 5, as well as two open questions were distributed at week 12 of semester. Students in both cohorts, who participated in PASS, improved their final grade in their respective subject and there was a reduction in failure rate. In addition, in both cohorts, students who attended PASS improved their confidence and believed the sessions provided them with important skills. For Paramedicine students, there was a statistical increase in their belief that the skills gained in PASS could be transferred to other subjects in their degree. Future studies should investigate if PASS improved progression and retention of these students.

Introduction

Improvements in teaching and learning have led to the development of a number of “students as partners” peer mentoring assisted learning and teaching activities (Stigmar, 2016). Student peer mentoring programs are an adjunct to traditional modes of teaching and are utilised at many tertiary education institutions worldwide. In general, the main purpose of the peer mentoring programs is to improve student learning outcomes, academic progression, social support for new students and student retention (Topping & Winterhoff, 2001). Largely, peer mentoring schemes in tertiary education settings are based on the principles of collaborative learning or on the closely related cooperative and active learning paradigm, whereby students come together in semi-formal settings to learn (Topping & Winterhoff, 2001).

At Victoria University (VU), Melbourne, Australia, one student peer learning model that is employed is Peer Assisted Study Sessions (PASS), which is based on Supplementary Instruction (SI) which was devised in the United States of America. The SI/PASS model is an academic assistance program using peer-assisted study sessions for 1st year undergraduates

facilitated by peer mentors who have been selected from 2nd year students with a high achievement in the previous year (Hryciw, Tangalakis, Supple, & Best, 2013). Each PASS session is regularly scheduled with the same peer mentors. Typically, each session is an informal review session in which students compare notes, discuss readings, develop organisational tools and engage in the understanding of core concepts. In the context of this study, students participating in the PASS sessions focused on physiology concepts. A key feature of the PASS program is the absence of a teacher/lecturer but the presence of two high achieving later year peers who plan and facilitate the PASS sessions. Having two peer mentors present in each session was implemented early in PASS at VU as it contributed to confidence-building and led to the creation of more interesting and supportive PASS sessions (Hammill, Best, & Anderson, 2015).

Peer mentors provide students with methods for understanding difficult concepts associated with their studies by developing organisational tools that assist in their understanding of the subject matter. However, a significant part of the mission of PASS is also to support first year transition to university (Kift, 2009). For heterogenous cohorts of students, the first year is essential for the establishment of a positive experience where students feel engaged, supported and realise their sense of belonging (Kift & Field, 2009). Further, previous research has demonstrated that the first-ever semester of university education is the optimum time for the introduction of such an intervention (Paloyo, Rogan, & Siminski, 2016).

The wider participation of students in university education has led to cohorts of non-traditional students undertaking higher education who previously may not have been able to do so (Loughlin, Watters, Brown, & Johnston., 2015). As a consequence, certain cohorts of students are more likely not to progress through their course in a timely fashion (Collier & Morgan, 2008). Many reasons can lead to students not progressing. Typically, students who are not engaged in the subject are likely to have poor attendance rates and consequently poor marks/assessment outcomes (Devlin & McKay, 2011). Research has suggested that the success of students can be predicted by factors such as socio-economic status (SES), sex and age. In general, male students perform poorly and mature age students perform extremely well (Lumb & Vail, 2004). Further, students from low SES (LSES) backgrounds are less likely to be equipped with the skill-sets necessary to complete their academic studies (Kirk, 2008). Consequently, these students are typically under-represented in Australian higher education (Coates, 2005).

Previously, we have established that the PASS program was beneficial for the Bachelor of Health Sciences (Paramedicine) cohort enrolled at VU (Hryciw et al., 2013). The majority of these students are typically mature aged (66% over 21 years) with a significant time period between the completion of high-school and undertaking university study. A limitation of the prior study (Hryciw et al., 2013), was that we were uncertain if the PASS program would be beneficial to students with different demographic characteristics. Therefore, in this study, we compared the Paramedicine cohort with students undertaking the Bachelor of Science (Biomedical Sciences) degree who typically comprise school leavers, with a high percentage “first in family to attend university” (FIF), from immigrant communities (30%) and entering university with limited educational capital - characteristics signalling cohorts “at risk” of non-completion of their degrees. The aim of this study was to determine if PASS would be equally beneficial to two diverse largely LSES student cohorts with predominantly mature aged (Paramedicine) or FIF students (Biomedical Sciences). The main hypothesis of this study is that PASS will improve the students’ final grade, decrease the failure rate and develop study

and time management skills and confidence in students' abilities to complete their studies. Further, we hypothesise that the same benefits of PASS will occur in both cohorts.

Context and Method

This study was approved by the Victoria University Human Ethics Research Committee (HRETH 10/20).

Participants

First year, undergraduate students enrolled in the Bachelor of Health Science (Paramedicine) or Bachelor of Science (Biomedical Sciences) at VU, participated in the study. The mentees in each PASS program were selected from students enrolled in the first year subject Bioscience for Paramedics 1 (Paramedicine) (total 201 enrolments) or Human Physiology 1 (Biomedical Sciences) (191 enrolments) in Semester 1, 2011. This selection occurred on a first-come-first served basis, with students emailing the chief investigator following advertisement of the program at the first lecture. Four mentors from each course worked in pairs to facilitate weekly group PASS sessions. They were students who had successfully completed the Bioscience for Paramedics 1 (Paramedicine) or the Human Physiology 1 (Biomedical Sciences) subject the year before and obtained a high grade (at least 80%) in the subject. As well as participating in competitive group and individual interview processes, peer mentors were required to complete a two day training program prior to the first PASS session, attend weekly workshops throughout the semester and contribute to an online reflective blog about their mentoring experiences (Hryciw et al., 2013).

Design

PASS sessions were held weekly for one hour over 10 weeks during the semester. Areas of study focus were chosen by the mentors and were based on the content of formal lectures (by faculty members/academics) and tutorials that were conducted parallel to or recently prior to the PASS sessions. Across the two cohorts, the content for the physiology taught was similar and typically taught by the same lecturers.

Student (mentee) opinion surveys were administered to students at the end of the PASS program (end of semester). The survey consisted of nine closed item questions and two open questions (Hryciw et al., 2013). The closed item questions followed a Likert rating scale from 1 to 5, where 5 equals strongly agree, 4 - agree, 3 - undecided, 2 - disagree, 1 - strongly disagree.

Statistics

The median values for closed survey questions for the mentees were analysed on the difference from the scale point of 3 (undecided) using the nonparametric Wilcoxon signed-rank test. The responses were compared for each question between the Paramedicine and Biomedical Sciences cohorts using a T-test. Statistical differences were identified with a $P < 0.05$.

Results

Student Academic Outcomes

Student participation in the study was voluntary and the completion of the surveys was not a requirement for the enrolment into the PASS program. The mean age of the students who attended PASS was not different between the two cohorts (Paramedicine or Biomedical Sciences), however the percentage of students enrolled over the age of 21 years was higher for the Paramedicine cohort (Table 1). The Biomedical Sciences cohort had a higher percentage of students from LSES, whilst the ratio of males to females was similar in both groups. These

data were similar to that for the students enrolled in both subjects as a whole. The ratio of male to female mentors in both groups was 1:3. Each group contained a maximum of 30 students. Students in both cohorts improved their final grade for their respective subject and reduced their failure rate if they participated in PASS (Table 1). Each week, Paramedicine students had a higher attendance rate (62%) compared with the Biomedical Sciences students (42%) (Table 1).

Table 1: Comparative data of Paramedicine and Biomedical Sciences participants

	Paramedicine	Biomedical Sciences
Number of students in PASS program (total enrolment in physiology subject)	50 (201)	59 (191)
Age of PASS attendees (years)	25 ± 7	19 ± 2
% PASS attendees over 21 years old	66	22
% PASS attendees identifying as low SES based on home address (% of PASS cohort)	15 (30%)	24 (40%)
% Males : females mentees	42:58	40:60
% Final grade (Compared to non-PASS attendees enrolled in same subject)	74 (67)	65 (54)
% Failure rate (Compared to fail rate for non-PASS attendees enrolled in same subject)	0 (17)	7 (24)
Average weekly PASS attendees per week /total number of people enrolled in PASS program	31/50 (62%)	25/59 (42%)
Ratio of male to female mentors	1:3	1:3

Mentee survey data

For the closed item questions in the survey, the median and interquartile range from mentee student responses are shown in Figure 1. At the completion of the PASS program, 82% and 80% of the Paramedicine and Biomedical Sciences students respectively, who had participated in the PASS program, responded that the PASS program was a positive experience (Figure 1). In both cohorts, students who attended PASS reported their confidence had improved and believed the sessions provided them with important skills (Figure 1). Specifically, students believed that the PASS program helped them to develop: 1) their confidence in understanding of the subject content; 2) their knowledge of the topics; 3) skills which allowed them to approach their other subjects positively; 4) time management skills; 5) social networks; and 6) strategies for learning through their degree. All students who participated in the PASS program strongly agreed that it had been a positive experience. In addition to this, the Paramedicine

students more strongly believed that the PASS program had shown them different ways of studying the material (Figure 1).

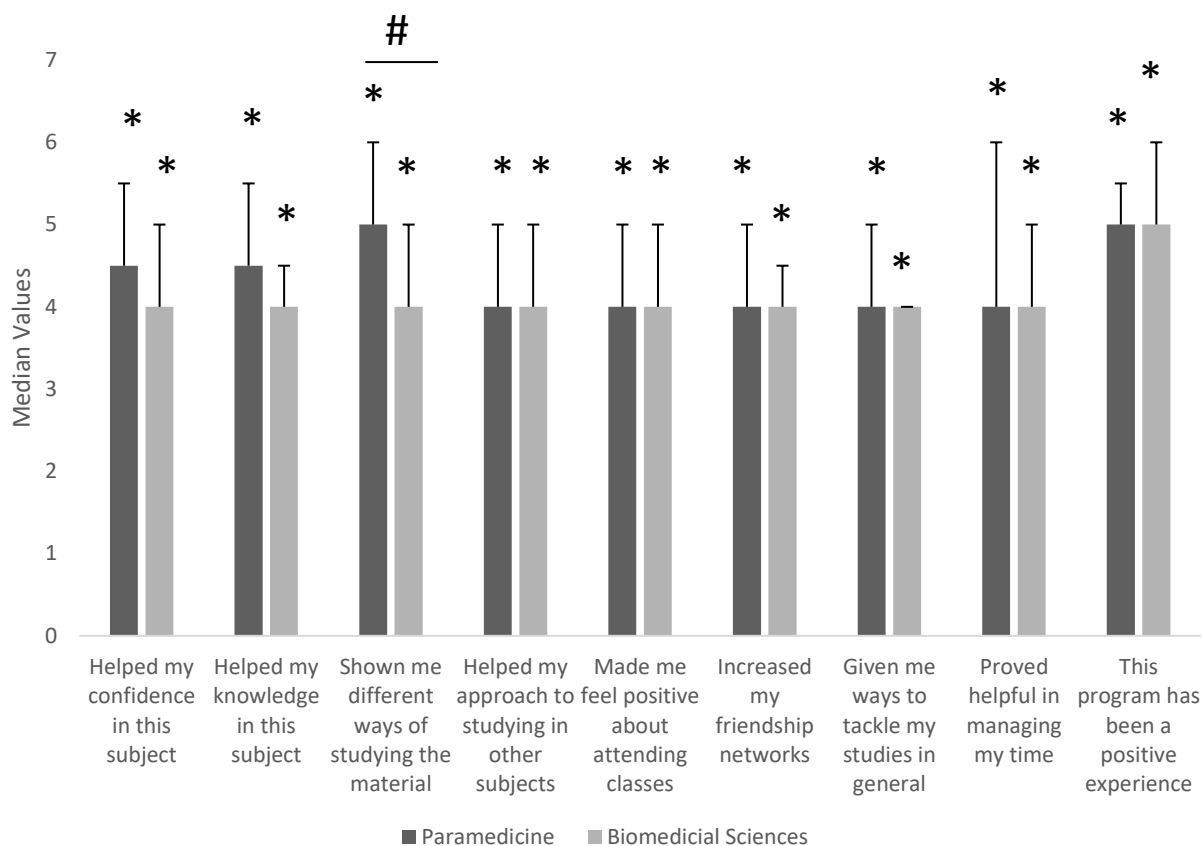


Figure 1: Mentor responses [median \pm interquartile ranges (IQR)] to closed items on an opinion survey, * $P < 0.05$ based on the difference in median values from the scale point of 3 (undecided) using the nonparametric Wilcoxon signed-rank test. # $P < 0.05$ based on the responses from the Paramedicine and Biomedical Sciences students.

For the open questions, the most frequent responses to the question of “the 3 things students gained by attending PASS sessions” were: extra understanding of content, confidence in their understanding of the content and tools and techniques to study effectively. When asked what “3 things they would like to see change in future mentoring sessions”, the 3 most common responses were more sessions per week, more use of materials that can be taken away from class (i.e. worksheets and handouts) and inclusion of the PASS program in other subjects associated with their degree.

Discussion

This study demonstrated that the PASS program improved student marks, reduced failure rates and was seen as a positive experience across two cohorts of “at risk” students who were enrolled in the Paramedicine and Biomedical Sciences degrees at VU. These findings are supported by our previous study and those of others (Hryciw et al., 2013; Topping & Winterhoff, 2001; Stigmar, 2016). Of note, a difference between the groups exists in that the Paramedicine students believed more strongly that the PASS program provided them with an alternative way of studying. It is important to note that the Paramedicine cohort had a higher

average age (25 years compared with 19 years). Thus, most have had an alternative occupation since returning to tertiary education, a number of years since they ceased pre-tertiary education and often they did not have any biology or chemistry knowledge. One Paramedicine student commented:

“I joined PASS so that I can get a better understanding of Bioscience, as I never studied Biology or Chemistry at high school.”

Engagement of students is influenced by factors including financial, work-life balance and personal aims in undertaking the study (Yorke, 1999; Kift, 2009). A significant difference between the Paramedicine and Biomedical Sciences cohorts is the type of degree, with the Bachelor of Health Science (Paramedicine) producing graduates with a defined career path and the Bachelor of Science (Biomedical Sciences) being a more a generic degree with no clearly defined vocation at completion. Anatomy and physiology theoretical knowledge are fundamental and crucial to Paramedics (Rathner & Byrne, 2014) and at VU, the year 1 subject ‘Bioscience for Paramedics 1’ is a hurdle so that failure in this subject results in students not progressing to the next semester or year of their degree program. This is compounded by the observation that some aspects of biology are perceived as being difficult by allied health professionals (Scalise, Claesgens, Wilson, & Stacy, 2006). However the issue of a lack of preparation seems to be more global than in the allied health programs. It is well known that in Australian Universities, there are increasing numbers of enrolled students in STEM programs who have little or no background in core science knowledge (Burgess, Yeung, & Sharma, 2015). Importantly, for the Paramedicine cohort, understanding physiology is key to questioning medical decisions, and ensuring patient safety (Jordan & Reid, 1997), with students required to retain facts and competently use these facts in complicated scenarios (Taradi, Taradi, Radic, & Pokrajac, 2005). An inquiry instruction environment with process orientated guided enquiry (Brown, 2010), may be more beneficial to the Paramedicine students where tasks are related to real life experiences in their careers. Further, Paramedicine students who are mature aged, perform better when their social and academic skills are enhanced (Kantanis, 2002).

Use of team-based active learning has previously been employed to promote good learning and study habits (Rathner, Hughes, & Schuijers, 2013), with group work an effective strategy as it assists in the development of generic graduate attributes such as teamwork and problem solving (Naiker & Wakeling, 2015). Further, activities which promote student centred learning, and run in parallel to traditional lectures, are thought to be an effective means of transmitting knowledge by placing active learning tasks within a cohesive framework (Davies, Murphy, & Jordan, 2000). In addition, peer-assisted study promotes good communication skills, which we and others have demonstrated are effective in improving student engagement and transition (Hryciw et al., 2013; Topping & Winterhoff, 2001; Stigmar, 2016). One Paramedicine student commented:

“PASS helped me to find new friends and make networks to help me study”.

Thus, students are identifying benefits in the PASS program not linked to their academic skills.

Though we did not explicitly assess this in our students, it is thought that Biomedical Science students struggle with first-year transition to university due to a significant proportion of them being disappointed at not being accepted into their first degree choice, which is most likely an accredited allied health or medical degree (Taylor & Harrison, 2016). Disenchantment with their course, in addition to deficits in academic skills, language barriers and social isolation are

all strong contributors to failure and attrition. Though not investigated as part of this study, future research should investigate if for the Biomedical Sciences cohort, participation in the PASS program improved the number of students graduating from this program overall.

A potential limitation in our study is the reliance on students to provide information regarding their SES. Our survey asked “what is your postcode”, and from this we extrapolated their SES status from the LSES postcode measure from the Australian Bureau of Statistics (ABS). We acknowledge that students may reside in a different suburb while undertaking their studies, which should be taken into consideration. Further, that the determination of SES from the postcode may not be an effective metric, with a more effective measure based on individual and geographic factors proposed (Devlin & O’Shea, 2011). Nonetheless, the percentage of students who participated in the PASS scheme and were considered to be LSES was 30% and 40% (Paramedicine and Biomedical Sciences, respectively). These percentages were higher than the overall number of LSES enrolled in these degrees (~20%). Though we did not explicitly question their motivation for attendance, the LSES students may have attended PASS to improve their outcomes from these subjects due to their belief that education is a means to better their lives, and avoid the social difficulties experienced by their parents (Lopez, 2001).

Both cohorts, with a high number of “at risk” students benefited from the PASS program as demonstrated by a reduction in failures and improvement in the average scores. However, attendance was stronger in the Paramedicine cohort. This may have also led to the higher average grade for the Paramedicine cohort (with similar content taught), and could be in response to the direct link between anatomy and physiology knowledge, and their long term career goals. Previous research has demonstrated that improvements in student confidence benefit the mature aged student, leading to an improvement in learning outcomes (Favero, 2011). Further, personal motivations such as family expectation and career motivation, as well as environmental support such as peer support and resources, may assist successful completion of higher education in students from at risk cohorts (Dennis, Phinney, & Chuateco, 2005). Of note, others have identified that students who feel socially connected to their academic peers, find benefit in a strategic development of social networks in first-year university students (Reid, Smith, Iamsuk, & Miller, 2016). Certainly, our mature aged cohort believed that the PASS program provided novel learning strategies, as well as an opportunity for the establishment of social networks (Hryciw, et al., 2013). However, the data presented here demonstrates that most of the benefits of PASS that were identified by the students (Figure 1), were similar for the two cohorts except for the benefit of novel strategies for learning, which was determined to be more beneficial for the Paramedicine cohort. Therefore, it is likely that irrespective of the “at risk” status of the cohort, all students gained benefit in the PASS program at VU.

PASS programs are well established across a number of different disciplines, and have provided benefit across different “at risk” cohorts of students. Future research should investigate the long term benefits of such a program, and the impact that these programs have on student transition and retention.

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